# Middle School STEM Certification Continuum

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Pre-Implementation</th>
<th>Continuum Implementation</th>
<th>Full Implementation</th>
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<tbody>
<tr>
<td>1. STEM Vision and Culture</td>
<td>No vision for STEM education is in place and a STEM culture is not evident in the school.</td>
<td>The vision for STEM is clearly defined and a STEM culture has been established within the program and/or school. Students articulate and live this vision and culture through their actions, passions, and perceptions.</td>
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<tr>
<td>2. Required for Program Certification: Identified STEM Students</td>
<td>No students are identified as STEM.</td>
<td>STEM students are identified, and a selection process is described.</td>
<td>STEM students are identified by a school designed selection process that has been vetted with successful longitudinal evidence.</td>
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<td>3. Non-Traditional Student Participation (Not applicable for whole school certification)</td>
<td>The non-traditional student participation does not reflect the diversity (gender, race, ethnicity, and special populations) of the student population.</td>
<td>A plan is being developed for outreach, support, and focus on non-traditional student populations.</td>
<td>A plan is in place for outreach, support, and focus on non-traditional student populations.</td>
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**Required**

- The STEM vision for the school/program is written.
- Middle schools can choose between a whole-school model or program only certification. Program Certification is a school-within-a-school model, must be at least 10% of the school population, and represent the demographics of the student body. STEM Program Certification cannot be a program exclusively for gifted and magnet students.
- The school provides evidence that a STEM culture has been established. Schools will decide how to showcase the STEM culture.

- Documentation of how students are selected based upon specific criteria such as interest, lottery, random selection, etc.
- A copy of the application for student entrance into the STEM program.

- Documentation of non-traditional student participation.
### 4. Characteristics of the STEM Curriculum

<table>
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<tr>
<th>Required</th>
<th>Written description of the unique characteristics of the STEM curriculum, which must include CTAE courses that support the STEM curriculum.</th>
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| **Example Artifacts** | Documented opportunities for:  
- student presentations of investigations and findings.  
- students to engage in regular “arguments from evidence” during classroom instruction  
- students to interact with STEM professionals and community partners to support curriculum  
- students to participate in Career Technical Student Organizations (CTSO’s example: FFA, TSA…) |

### 5. Student Rigor & Relevance and Instructional Quality

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<tr>
<th>Required</th>
<th>Submission of at least two examples of student work that has occurred at the Adaptation level of the Rigor and Relevance Framework</th>
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<td><strong>Example Artifacts</strong></td>
<td>Project examples that demonstrate culture of inquiry, creativity, and innovation exists among students, teachers, and administrators.</td>
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</table>

### 6. Professional Learning: Teacher Content Knowledge

| Teachers are increasing content knowledge through multiple means such as PSC approved endorsements with an emphasis on math and science, content collaboration with business/industry, post-secondary, and informal |
| None of the teachers are working toward increasing content knowledge. |
### Required
- Documentation for method / procedures for increasing content knowledge for all teachers.
- Documentation of the plan for sustaining content knowledge and induction of new teachers.

#### 7. Professional Learning: Instructional Practices

<table>
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<tr>
<th>Required</th>
<th>There is no STEM related professional development currently planned and none has been offered in the last year.</th>
<th>Teachers, instructional coaches, and administrators have on-going STEM-specific professional learning and there is evidence of its implementation in classroom instruction.</th>
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<tbody>
<tr>
<td>Documentation of STEM specific professional learning for all teachers, instructional coaches, and administrators that incorporates the following:</td>
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</table>
  - Project/problem/place-based learning
  - Interdisciplinary instruction
  - Investigative research-based practices
  - Collaborative planning practices
  - 21st Century thinking skills and school-wide use of process-based thinking (Example: Engineering Design Process, Design Thinking, etc) |
| Documentation of visits to other STEM or STEAM Certified Schools including the school staff that visited and the school location of the visit. |

#### Example Artifacts
Documentation of teacher and administrator participation in district, GADOE, and national STEM professional learning. Examples: GA Department of Education STEM/ STEAM Teacher Academies, GA Department of Education STEM / STEAM Forum, GA Department of Education STEM/ STEAM Leadership Cohort

#### 8. Teacher Collaboration

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<tr>
<th>Required</th>
<th>There is no collaboration or collaboration is not structured or planned.</th>
<th>Teachers collaborate quarterly using Georgia Standards of Excellence to identify learning targets, plan interdisciplinary units, and day-to-day instruction that use process-based thinking.</th>
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<tr>
<td>The school administration must provide collaborative planning time at a minimum of once a week.</td>
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<td>Business and community partners participate in teacher planning.</td>
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<td>CTAE teachers are involved in collaborative planning time.</td>
<td>Teachers collaborate monthly using Georgia Standards of Excellence to identify learning targets, plan interdisciplinary units, and day-to-day instruction that use process-based thinking.</td>
<td>Teachers collaborate at least weekly using Georgia Standards of Excellence to identify learning targets, plan interdisciplinary units, and day-to-day instruction that use process-based thinking.</td>
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• Documented evidence of weekly STEM collaborative planning time including meeting agendas /minutes and artifacts generated.

| 9. Math and Science Instruction | Students do not take high level math and science course work | 25% of 8th grade STEM students are enrolled in high school math and science. Additional supports are instituted to assist students in meeting these expectations | 50% of 8th grade STEM students are enrolled in high school math and science. Additional supports are instituted to assist students in meeting these expectations | 75% of 8th grade STEM students are enrolled in high school math and science. Schools may offer high school CTAE courses. Additional supports are instituted to assist students in meeting these expectations |

**Required**
Documentation of the number of students enrolled and passing high school CTAE courses, if offered, high school physical science, and high school mathematics.

| 10. Business, Community, and Post-Secondary Partnerships | There are no business, community, and post-secondary partnerships. | Plans are being developed to provide student opportunities to meet STEM partners and to participate in STEM learning environments directly connected to in-class learning. | Business, community, and post-secondary partnerships are involved in the STEM instructional program 1-4 times/school year and are directly connected to in-class learning. | Multiple business, community, and post-secondary partnerships are ongoing and are involved by directly connecting to in-class instruction, project/problem-based learning, and exposing students to STEM careers. |

**Required**
Documentation partnership involvement at all three levels based upon the [STEM Georgia Partnership Involvement Levels](#).

| 11. STEM Competitions, Exhibits, Clubs, and/or Career Tech Student Organizations | No students are involved in STEM competitions, on-site STEM exhibits, CTSOs, and/or in state and national STEM forums or clubs. | Some of the students participate in STEM competitions, STEM exhibits, CTSOs, and/or in state and national STEM forums or clubs. | A majority of the students participate in STEM competitions, STEM exhibits, CTSOs, and/or in state and national STEM forums or clubs. |

**Required**
Documentation that shows how many students participate in STEM competition, exhibit, club, or CTSOs.

| 12. STEM Curriculum: | Students are not engaged in solving authentic, real-world problems. | Students are engaged in solving authentic, real-world problems, but they are not tied to the local community. | Long-term projects/problems are implemented throughout the school year that are standards-based, |

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Project/Problem-Based Learning

interdisciplinary, and engage students with real-world problems in their community.

Required
- Students can articulate the relationship between math and science concepts in their interdisciplinary projects.
- Written summary of grade level specific, interdisciplinary, problem/project-based learning opportunities that have occurred throughout the school year (curriculum map, timeline, calendar, etc).
- Documentation of how project and problem-based learning connects to Georgia Standards of Excellence.
- Students have documentation of long-term project-based learning in their STEM journals. This documentation includes the use of school-wide process-based thinking.
- Student work created in collaboration with a business/community/post-secondary partner. Partners provide coaching and feedback throughout the project.

13. STEM Curriculum: Day-to-Day Interdisciplinary Instruction

| Content areas are taught in isolation. | Students are engaged in interdisciplinary instruction 1-3 times a month. | Students are engaged in interdisciplinary instruction 1-3 times a week. | Students are engaged in daily interdisciplinary instruction that supports Georgia Standards of Excellence mastery. |

Required
- Students can clearly articulate connections between math and science concepts being studied and provide evidence of learning through use of their STEM journals.
- Teachers review district pacing guides to determine connection between disciplines and standards.

14. Technology Integration

| There is little or no technology integration in the classroom. | A technology plan is in place to integrate a variety of technology tools supporting mastery of Georgia Standards of Excellence. | A school-wide technology plan is implemented. Classrooms include a variety of technology tools that are integrated at least weekly that support mastery of Georgia Standards of Excellence. | Technology use is ubiquitous throughout STEM classrooms and students are producers and not just consumers of digital content that support mastery of Georgia Standards of Excellence. |

Required
- Submission of at least two student-produced products using technology.

Example Artifacts
- Students are regular producers of websites, blogs, computer programs, videos, classroom digital products, apps etc.
- Instructional technology equipment is rarely inoperable
- Teachers and students receive on-going access and opportunity to expand their proficiency in technology use

15. Investigative Research

| There is no investigative research occurring in classes. | STEM students are conducting investigative research, but it is not connected to the grade-level | STEM students conduct investigative research to make claims, collect evidence, analyze data, and argue from evidence that |

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### Required
- Students can communicate results via written, oral, and digital presentations.
- Submission of at least two student investigative research topics and their findings.

### Example Artifacts
- Documentation of student analysis and data interpretation, explanations and design solutions, and engagement in argument from evidence
- Documentation of student use of Claim-Evidence-Reasoning model.
- Documentation of how investigative research is used to improve student solutions in both day-to-day instruction and long-term project.
- Students present findings to a public audience that includes business and community partners
- Student research is posted in hallways and classroom walls

### Required
- Students utilize school-identified problem-solving process (i.e. Engineering Design Process, Design Thinking, or school-created version) or Claim, Evidence, Reasoning framework. This is guided by teacher to ensure standards mastery.
- Submission of at least two examples of student journal use
- Documentation of how teachers plan for student journal usage during weekly collaboration

### Required
- Schools indicate evidence the STEM curriculum is increasing student academic growth over a three-year period through The Georgia Milestone Assessment, CCRPI.
- Schools submit a plan to indicate how they will continue to grow and sustain STEM culture.